

REMARKS

I. Introduction

In the Office Action of June 3, 2003, independent Claims 1 and 19 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,058,047 to Kikuchi, and independent Claims 9 and 47 were rejected under 35 U.S.C. § 103(a) as being obvious over a proposed modification to Kikuchi. Applicants respectfully request reconsideration and withdrawal of those rejections in view of the amendments and remarks made herein.

II. Independent Claims 1 and 19

In the Office Action, it was asserted that col. 1, line 65 to col. 2, line 20 of Kikuchi teaches a write-many memory device that is limited in the number of times a block of memory can be written to and, accordingly, anticipates Claims 1 and 19. To clarify the invention being claimed in Claims 1 and 19, Applicants have amended those claims to recite that N (the number of writes each block is limited to) is fewer than a maximum allowable number of qualified writes to the block. The elements being added to independent Claims 1 and 19 are similar to those previously recited in now-cancelled dependent Claims 8 and 23, respectively. In discussing those claims on pages three and four of the Office Action, the Examiner admitted that Kikuchi does not disclose limiting the number of times a block can be written to to a number less than the maximum allowable number of writes. In accordance with this admission, Applicants respectfully submit that Kikuchi does not anticipate amended Claims 1 and 19, and, accordingly, that the 35 U.S.C. § 102(b) rejections against Claims 1 and 19 should be removed.

Applicants also submit that there is no suggestion to modify Kikuchi to yield amended Claims 1 and 19. Applicants note that now-cancelled dependent Claims 8 and 23, which closely correspond to amended Claims 1 and 19, respectively, were rejected in the Office Action as

being obvious over Kikuchi. However, those claims were rejected without presenting any explanation as to why one skilled in the art would have been motivated to make the proposed modification. Instead, the Office Action simply asserted that it would have been obvious to limit the number of times each block can be written to to a number less than the maximum allowable number of writes. Applicants respectfully disagree because Kikuchi teaches against the very modification proposed in the Office Action.

The basic operating principle of Kikuchi is to provide a more efficient use of memory by writing to a block *more* — *not fewer* — times than the maximum allowable number of qualified writes. In col. 2, lines 3-20, Kikuchi explains that a block of memory may be able to be written into more times than the maximum number of writes set by a memory device manufacturer because such “maximums” may not truly be indicative of the life of a block. Kikuchi criticizes using such false maximums for leading to an inefficient use of memory and proposes a solution in which a block of memory can be written into more than what would have been the maximum number of writes set by a memory device manufacturer. Specifically, instead of tracking the number of writes, Kikuchi’s proposed solution tracks the number of read errors, which Kikuchi believes is a more accurate representation of the life of a block of memory. A block of memory can be written to as long as the tracked number of read errors is below a predetermined amount — irrespective of the number of times the block has been written to.

If Kikuchi were modified as proposed in the Office Action, the result replaces Kikuchi’s solution with the problem. That is, Kikuchi teaches that efficient use of a block comes from writing to the block more than the maximum number of writes set by a manufacturer. Under the proposed modification, fewer — not more — writes would occur as compared to the conventional memory devices criticized by Kikuchi. Accordingly, the proposed modification

would provide for an even less efficient memory than the one over which Kikuchi sought to improve. Because of this, Applicants respectfully submit that one skilled in the art would not have been motivated to modify Kikuchi to yield the claimed invention.

Applicants also note that Kikuchi's solution for a more efficient memory does not anticipate or render obvious Claims 1 and 19 because the embodiment disclosed in Kikuchi limits the number of *errors* that a memory cell can take — ***not the number of writes***. As shown in Figure 3 and described at col. 4, lines 41-45, as long as a predetermined number of errors does not occur in a block, writing to the block is not inhibited. Indeed, the block can theoretically be written into an unlimited number of times provided that the maximum number of read errors has not been encountered.

In summary, because Kikuchi does not teach or suggest limiting the number of writes to a number less than a maximum allowable number of qualified writes, Applicants respectfully request that the rejections of independent Claims 1 and 19 and their dependent claims be removed.

III. Independent Claim 9

Independent Claim 9 recites a write-many memory device comprising a plurality of blocks of memory. Each block comprises a first sideband field storing data indicating whether the block is free and a second sideband field storing data indicating how many times the block has been written into. In the Office Action, it was asserted that the second region 52 shown in Figure 1 of Kikuchi corresponds to the recited second sideband field storing data indicating how many times the block has been written into.¹ Applicants respectfully disagree.

¹ In the Office Action, it was admitted that Kikuchi does not teach the recited first sideband field.

The second region 52 shown in Figure 1 of Kikuchi indicates how many errors occurred when reading from a block — ***not*** how many times the block has been written into. As expressly stated at col. 3, lines 22-24 (emphasis added), the “second region 52 [serves] as a count storage region for ***storing the count value corresponding to the number of 1-bit errors detected*** when data written in the block 3 are read.” None of the other regions shown in Figure 1 of Kikuchi store data indicating how many times the block has been written into either. The first region 51 stores ECC, and the third region 53 stores “good-no-good” identification data. Because Kikuchi does not disclose a field storing data indicating how many times the block has been written into, Applicants respectfully request that the rejection of Claim 9 be removed.

There are additional deficiencies in Kikuchi. Element (c3) in Claim 9 recites that the second sideband fields are updated to indicate the correct number of times the blocks have been written into. Because Kikuchi does not disclose a field that stores data indicating how many times a block has been written into, Kikuchi necessarily does not perform this act. Additionally, even if the second region 52 in Kikuchi were misconstrued to correspond to the recited sideband field, Kikuchi would still be deficient. Element (c3) is performed before or after a file is ***stored*** in a block. In contrast, the second region 52 in Kikuchi is updated after data is ***read*** from a block. As described at col. 3, lines 40-62, the second region 52 is updated after an error detector determines there is an error in ***reading*** data from a block. See also the flow chart in Figure 3, which shows the second region 52 being updated at step 7, after a read-out command at step 1. Because the second region 52 is updated with a read operation and not with a write operation, Kikuchi fails to disclose another recited element in Claim 9.

Applicants also respectfully submit that one skilled in the art would not have been motivated to modify Kikuchi to track how many times a block has been written into because such

a modification is contrary to Kikuchi's basic operating principle. The basic operating principle in Kikuchi is to keep track of the number of read errors *instead of* the number of times a block has been written into. Kikuchi explains that keeping track of the number of read errors leads to a more efficient use of the memory because the life of a block is more accurately judged by the number of read errors rather than by the number of times it has been written to. If Kikuchi were modified to yield the claimed invention, the modification would reintroduce the very inefficiencies that Kikuchi set out to avoid. Because of this, one skilled in the art would not have been motivated to modify Kikuchi to yield the claimed invention.

In summary, because the rejection of Claim 9 assumes that Kikuchi teaches claim elements that Kikuchi does not, in fact, disclose and because there is no motivation for one skilled in the art to modify Kikuchi to yield the claimed invention, Applicants respectfully request that the rejections of independent Claim 9 and its dependent claims be withdrawn.

IV. Independent Claim 47

Independent Claim 47 recites rendering at least some write-many memory cells in a memory array write-once by preventing more than one write to those cells. In the Office Action, Claim 47 was rejected as being obvious over Kikuchi. It was argued that since col. 2, lines 3-7 of Kikuchi teaches limiting the number of writes between 100,000 to 1,000,000, it would have been just as easy to limit the number of writes to 1. However, this is not the test for obviousness. Rather, the test is whether one skilled in the art would have been motivated to make the proposed modification. Applicants respectfully submit that the required motivation to make such a modification is absent because Kikuchi teaches away from the very modification proposed in the Office Action.

In col. 2, lines 3-20, Kikuchi criticizes prior memory devices that limit writes to 100,000 to 1,000,000 times as being inefficient. Kikuchi explains that a block of memory may still be writable even after reaching a predetermined number of writes set by a device manufacturer. As such, limiting the number of writes to a predetermined number (such as a number in the range of 100,000 to 1,000,000) leads to an efficient use of memory. Kikuchi proposes a solution whose basic operating principle is to provide more efficient use of memory by performing *more writes* — *not fewer, and certainly not one* — than would be possible with conventional memory devices that limit writes to 100,000 to 1,000,000 times. Under the proposed modification, the very problem that Kikuchi sought to overcome is reintroduced in the extreme. Instead of making more efficient use of memory by writing to it more than 100,000 to 1,000,000 times, the proposed modification would limit the number of writes to 1. With the exception of completely prohibiting all writes, this is the most inefficient use possible of a write-many memory — certainly not something suggested by Kikuchi.

Because the proposed modification is both taught against by Kikuchi and contrary to its basic operating principle, Applicants respectfully submit that one skilled in the art would not have been motivated to modify Kikuchi to yield the claimed invention. Accordingly, Applicants respectfully request that the 35 U.S.C. § 103(a) rejections of independent Claim 47 and its dependent claims be withdrawn.

V. Conclusion


In view of the amendments and remarks made herein, Applicants respectfully submit that all claims are in condition for allowance. Reconsideration is respectfully requested. It should be noted that while the arguments presented herein were directed to the independent claims, each of

the dependent claims provides additional grounds of patentability over Kikuchi. Applicants expressly reserve the right to argue those additional grounds at a later time, if necessary.

If there are any questions concerning this Amendment, the Examiner is invited to contact the undersigned attorney at (312) 321-4719.

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Respectfully submitted,



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